

subsequently washed and prepared for reaction with a new set of monomers. Dimers, trimers, and larger polymers of controlled length and monomer sequence are prepared by repeating the above steps with different groupings of the reaction regions and monomer solutions.

- 5 In alternative embodiments, the polymers or other compounds of the array are delivered to the regions as complete species, and thus the above polymer synthesis steps are unnecessary.

In a preferred embodiment, a plurality of reaction regions on the substrate surface are surrounded by a constraining region such as a non-wetting region which hinders the transport of reactants between adjacent reaction regions. Thus, the reactants in one region cannot flow to other regions where they could contaminate the reaction. In certain preferred embodiments, the regions of the array are defined by selective irradiation of a substrate surface containing photolabile hydrophobic protecting groups. In areas where the surface is irradiated, the hydrophobic protecting groups are removed to define reaction regions. When an aqueous or other polar reactant solution is deposited in the reaction region, it will have a relatively large wetting angle with the substrate surface so that by adjusting the amount deposited, one can ensure no flow to adjacent regions.

A further understanding of the nature and advantages of the inventions herein may be realized by reference to the remaining portions of the specification and the attached drawings.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a generalized diagram illustrating the invention;

Fig. 2 is a flow chart illustrating the treatment steps performed in synthesizing an array of various polymers;

Fig. 3 is a mapping of a resulting array of polymers;

Fig. 4a to 4c illustrate the arrangement of three channel block templates in six process steps employed to synthesize 64 million hexapeptides from a 20 amino acid basis set;

Fig. 5a is a top view and Fig. 5b is a cross-sectional view of a first embodiment of a device used to synthesize arrays of polymer sequences;

Fig. 6 is a cross-sectional view of an embodiment containing a pressure chamber for holding a substrate against a channel block;

Figs. 7a and 7b are top views of two of two different "fanned array" channel blocks;

Fig. 8 is a cross-sectional view of a channel block and associated flow ports according to one embodiment of the invention;

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## DRAWINGS

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Make correction yourself if:

- A granted petition to accept color drawings exists, but the required color drawings paragraph is missing. Immediately preceding the brief description of the drawings section of the specification, enter the following paragraph:

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